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ABSTRACT

This paper discusses two primary instructional goals of Feuerstein's instrumental enrichment approach to remedial educational interventions. The instrumental enrichment approach is a method of classroom intervention directed toward helping students acquire the logical and psychological prerequisites of independent formal thought. The first and most basic aim is that of promoting structural cognitive modifiability by emphasizing the involvement of students in effective mediated learning experiences designed to increase metacognitive awareness. The second major objective of the program is the development of efficient, systematic thinking and problem-solving skills by exposing students, regardless of specific etiology or mental dysfunction, to situations demanding employment and adaptation of new, innovative, efficient, and relevant mental strategies. The paper also compares Feuerstein's approach with other cognitively-oriented programs, focusing on issues such as theoretical framework and affiliation, practical application, and research-related issues. A short review of the literature in the area of metacognition is included. (Author/RH)

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DEVELOPING META-COGNITIVE AWARENESS:

AN ALTERNATIVE INSTRUCTIONAL MODEL

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ABSTRACT

This manuscript focuses on the two primary elements which form the instructional goals of Feuerstein's Instrumental Enrichment. The first and the foremost is the intent of the FIE training program to promote Structural Cognitive Modifiability via the emphasis on providing effective Mediated Learning Experience (MLE) which is designed to increase Insightful Learning, i.e. Meta-Cognitive Awareness. The second major objective of the program is the development of efficient, systematic thinking and problem-solving skills which is achieved by exposing the learner (regardless of his/her specific etiology or mental dysfunction) to situations that demand the employment and the adaptation of new, innovative, efficient and relevent mental strategies.

The manuscript also compares Feuerstein's unique approach with other Cognitive-oriented programs. The comparison focuses on issues such as: Theoretical framework and affiliation, practical application and Research related issues.

A short review of the literature in the area of Meta-Cognition is provided as well.

INTRODUCTION:

In expressing his concern over the severity of the problem facing the American educational system today, Jerome Brunner (Hall, 1982) has openly assailed various educational remedial approaches. While on one hand he criticizes several presently popular educational approaches in particular, Brunner singled out one interventional approach, called "Instrumental Enrichment" (IE) primarily because in his opinion, it contained a unique and crucial component which is missing in all the other educational programs, and which he considers crucial in meeting the needs of most inefficient learners. The unique feature that differentiates between IE and other cognitive remedial techniques is its "meta-cognitive" component.

The importance of the inclusion of the meta-cognitive component in any form of educational remediation which is designed to enhance and develop intellectual skills has been emphasized and advocated by many cognitive theorists (Pascual-Leon, 1978; Brown, 1978; Sternberg, 1983; Butterfield, 1977; Bransford, 1984; Flavell, 1978) These theorists basically agree on a definition of meta-cognition as a form of awareness (on the part of the learner) - a capacity which enables the individual to assemble, coordinate and integrate his existing knowledge and skills into new schema. "Meta-cognition basically refers to one's knowledge, concerning one's own cognitive processes and products, or anything related to them, e.g. the learning relevant properties of information or data" (Flavell, 1978). An expansion of this definition is offered by others who view meta-cognition as a process of monitoring regulation and orchestration, which follows the data gathering process (Sternberg, 1983). Similarly, other theorists differentiate between cognitive skills that are necessary for data gathering vs. meta-cognitive skills, which are higher order cognitive functions which primarily contribute to the learner's awareness of the strategies necessary for the organization of a new data (Bransford, 1979). Bransford reinforces this distinction by stating that many studies suggest that people can be taught specific strategies that will help them improve their performance. Obviously,

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these people show a degree of modification. However, they do not yet learn how to learn, they merely learn how to perform a given task under given circumstances. A totally different type of training mode may be required in order to achieve meta-cognitive competency.

A substantiation of this position (i.e., the need to develop meta-cognitive competence) is available from several sources. After many years of research with mentally retarded population, Anne Brown (1980) concludes that after trying out various instructional approaches (role recall strategies, informal training, self control training), the best results were achieved when the instructions emphasized the students self control and self awareness of their own learning processes. Students who did poorly on the various tasks were the ones who (although could follow the instructions offered by external sources) were not able to integrate the rules and were not able to self manage the instructions for themselves, i.e., they were lacking meta-cognitive skills.

A similar distinction between mastery of cognitive skills vs. meta-cognitive awareness and competence is made by Wertsch (Burns, 1982), who worked with a younger disadvantaged population. Wertsch's research involved working with mothers who were trained to mediate cognitive functions to their pre-school children. In his study the mothers were trained to provide their children with activities that would enhance not only task-related cognitive strategies, but also would increasein the young learners, meta-cognitive awareness as well.

Sternberg's (1983) definition of the meta components of the mental act are similar to that of Brown, Pascual-Leon and others and perhaps provide the most precise operational definition of Meta-cognition. According to Sternberg, Meta-cognition is of "executive processes" which are used in planning, monitoring and evaluating one's information processing". In summarizing the importance of developing meta-cognitive functions, Sternberg suggests that these functions are the ones which contribute to a more intelligent behaviour. In proposing the prerequisites of an intellectual skills training program,

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Sternberg (1983) suggests that such a program should provide explicit training in both executive and non-executive information processing, as well as interaction between the two kinds of information. Very few programs which are labelled as "cognitive" meet Sternberg's criteria. Most of them are still content oriented (Covington, 1974, Whimby, Lochead, 1980). or they are short in duration, are not extensive, or not comprehensive enough. Others (de Bono, 1976; Lipman, 1981), are limited in their scope and application. Most of these programs lack the two major components discussed by Sternberg; solid theoretical framework and meta-cognitive component. Feuerstein's Instrumental Enrichment (FIE) is referred to by Sternberg (1981) as meeting the criteria for an efficient intellectual skills training procedures. The attempts to develop meta-cognitive awareness are emphasized both in Feuerstein's theory of Structural Cognitive Modifiability (SCM) through the programs six sub goals (which are very similar to Sternberg's criteria for the development of meta-cognitive competency) and in the quality of the mediation provided by the teacher. (the actual teaching of the programs contents)

The theoretical framework for Feuerstein's approach is based on the Piagetian and neo-Piagetian learning theories, as well as on Vygotsky's "Zone of Proximal Development" thesis (Vygotsky, 1978). Both these sources underline the importance and the effects of the interaction between the organism, the environment, and the potential of the organism's mental structure to be modified by experiences. These theorists recognize the crucial contribution made by intensive mental stimulation during the early years of the child's life and its effects on later intellectual development and performance. As an extention for both theories, Feuerstein focuses on one single component which he labells Mediated Learning Experience (MLE). Like Wertsch, he identifies the main characteristics of effective early parental mediation. Those characteristics, according to Feuerstein cannot simply be described as parental teaching skills or strategies. He defines them as a direct attempt on the part of the mediator, (the parent) to create a special intellectual awareness in the young learner. This type of mediation (teaching) implies and includes a meta-cognitive awareness on the part of the mediator (the parent-teacher) as well as

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on the part of the learner (the child).
The following are the components identified by Feuerstein as fundamental elements of any efficient mediation:

1 INTENTIONALITY:

The expression of the parents intentions and the desire to assist the child and to develop and expand his cognitive abilities.

2 MEANING:

To facilitate the child's understanding of the true meaning of the task, the concept and the situation (as related to the task).

3 TRANSCENDENCE:

Inducing in the child the ability to transfer and generalize newly acquired skills and principles into various novel unrelated situations.

4 BEHAVIOURAL CONTROL:

To assist the learner to realize that he controls his own task related cognitive behaviours; i.e., his own approaches and strategies (trial and error, comparison, discrimination, impulsivity, blocking, etc.,) at the same time the learner assumes the responsibility for a change in his approach or strategy; this responsibility will enhance his awareness of his own thinking and his own control over decision making.

5 SHARING:

This component relates to the feeling of cooperation between the learner and the mediator. Such an interaction is also designed to reduce egocentricity and increase communication and understanding between the learner and the mediator.

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6 MASTERY AND COMPETENCE:

This is achieved by informing the learner of his progress and by promoting the learner's own feelings of success. This process will increase the learner's confidence in his ability to self mediate (rather than be dependant on ongoing external mediation).

In summorizing these six elements Feuerstein discusses the possible detrimental (intellectual) consequences that could result when such mediation is absent, inefficient, or insufficient. But, unlike other theorists, Feuerstein believes that these intellectual deficits can be remediated at any age or any stage of one's development. Feuerstein's Instrumental Enrichment (FIE) is the tool (curriculum) by which intellectual deficits (caused by inappropriate MLE) can be remediated and enhanced.

META-COGNITIVE TRAINING MODEL - FEUERSTEIN'S INSTRUMENTAL ENRICHMENT (FIE)

The approach to cognitive education known as Instrumental Enrichment was developed in Jerusalem by Feuerstein and his colleagues (Feuerstein, Rand, Hoffman and Miller; 1980).

Instrumental Enrichment is a method of mediating learning experiences to students through classroom intervention directed toward the acquisition of the logical and psychological prerequisites of independent formal thought. There are 14 "instruments", with others currently under development. While each of the instruments is directed toward the development of a particular cognitive skill, each one calls upon a variety of cognitive functions in the completion of the tasks. Completion of the program of Instrumental Enrichment requires approximately 300 classroom hours, distributed over 2 academic years. It is presented as a supplement to the regular content curriculum, rather than as a substitute for any part of it.

The Instrumental Enrichment technique focuses on the dynamic interaction between teacher and students, with the teacher characteristically introducing a concept, providing verbal labels and symbols with which the students can manipulate that concept, and

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stimulating and encouraging classroom discussion of the concept. This period of classroom discussion is followed by paper and pencil work with the actual instruments, in the form of work sheets and exercises whose function is to give the students an opportunity to demonstrate their mastery and their generalization of the concepts that they have just discussed with the teacher.

THE IMPLICIT AND EXPLICIT OBJECTIVES OF THE PROGRAM:

The quality and the scope of the training which is generated through the teaching of the various instruments transcends beyond and above the exercises obvious explicit intentions. The impact of the content of the Instrumental Enrichment curriculum can be appreciated on two different (although not mutually exclusive) levels. On the more concrete obvious level the content and the explicit intent of the various exercises is to guide the learner through carefully selected and intentionally structured activities intended to assist the learner to develop some very fundamental information processing skills. The intensive exposure to these high level problem solving activities necessitates the development of some basic intellectual strategies and techniques. The familiarity with the various intellectual processes and the cognitive competence are achieved through the process of habituation. This process is reinforced by a constant demand that the learner first interiorize the concept and then spontaneously utilize it in a form of increased efficiency in his problem solving behaviour. Each of the Instrumental Enrichment (IE) units carefully attempts to impose on the learner the acquisition of various fundamental cognitive skills through the Dots, Analytic Perception and Instructions where the students are expected to learn to curtail their impulsivity by being encouraged (through the exercises and with the aid of the IE teacher) to deal and carefully assess their responses. While working on Orientation In Space I and II and Temporal Relationships units, the students are exposed to experiences that demand the utilization of orientational skills, sequential thinking, the formulation and the assessment of their position (both psychologically and geographically) within their immediate and more distant universe. Further elaborational processes are introduced through most of the second year curriculum, which

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emphasized primarily the concepts of relationship between components of information, such as units of space, time and distance.

Relational thinking, which is the foundation of all high level processes is being introduced and reinforced even earlier through the Comparison and the Categorization instruments. The systematic search for rules and principles governing relationships, and the analysis of the complexity which underlies intricate networks of information, are taught in these two units. Divergent and convergent thinking are emphasized as well throughout the more advanced units, which introduce to the learner the view that information, stimuli, thoughts and actions, do not operate or occur in an episodic fashion. The various pathways and networks that make up our cognitive structure allow us to benefit from the intake of information, but would improve its retention and subsequent use. The teaching of the IE curriculum provides the student with many prerequisite thinking skills, but the real intent of the training goes beyond the teaching of the necessary cognitive skills. At a much higher level, the teaching inherent in the IE philosophy and procedures attempts to create in the learner the need to understand, the need to hypothesize, the need to infer; it motivates the learner to become aware of his own thought processes. In that way the IE curriculum (and the mediator) provides the learner with a meta-cognitive awareness. Such an awareness is distinctively different from the mere mastery of various cognitive strategies that may assist the learner in solving a specific problem. The IE curriculum aims at evoking in the learner an insight, a cognitive insight, which will free him to seek alternative strategies, develop flexibility in thinking, and reduce his egocentric perception of the world. The teaching of meta-cognitive awareness is achieved through the competent guidance of the trained IE mediator (teacher). His teaching methodology, his unique questioning style (which elicits elaboration by probing). his encouragement of divergent approaches to problem solving, his constant demand for reasonable answers (which are supported and documented by carefully researched facts and precisely analyzed data) contributes to the development of this insightful thinking, which is the ultimate goal of the program.

Thus, while on one hand Feuerstein's program (the instruments)

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provides the content for the teaching of the specific cognitive skills which are the prerequisites of all types of learning, it also attempts to reshape the learner's cognitive structure by modelling for him an insightful, meaningful and a more efficient way of processing information. The ultimate goal of the IE procedures is not so much the mastery of the exercises themselves, but the continuous application of this newly acquired, insightful, intellectual awareness in other situations. The awareness, which is compatible with the higher order meta-cognitive competence, will affect the individual's behaviour and will enhance his dealing with problematic situations at home, at school, or at work. Such an awareness would affect all three levels of the individuals mental act; input, elaboration and output (Feuerstein, 1980). As such, a model of a program like the IE could have profound meta-cognitive effects that should be reflected in the individual's performance and behaviour.

A key factor in the implementation of such a model is a well trained, well versed teacher who himself appreciates both the complexity of the value of introducing meta-cognitive elements into his teaching style. The teacher's ability to personally reach meta-cognitive (abstract) level as part of his own thought processes is crucial prior to his intent to introduce a meta-cognitive teaching model to his students. As suggested by Feuerstein and confirmed by others (Orme, 1978; Weber, 1983), the teacher is the key for the arousal of higher meta-cognitive component in the learner. It is the teacher's teaching techniques that arouse and motivate the learner to elaborate and develop his thought processes to a level unachieved before.

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